Fibroblast growth factor 1 (FGF1) transfected adipose-derived mesenchymal stem cells (AD-MSCs ^{FGF1}) promote angiogenic proliferation

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BACKGROUND

Adipose-derived mesenchymal stem cells (AD-MSCs) have recently gained attention as a promising source for stem cells intervention and the therapeutic efficacy of AD-MSCs has been evaluated in various preclinical studies. In recent years, the gene modified and gene transfected mesenchymal stem cells have been proposed to enforce the paracrine effect of MSCs in producing the desired growth and trophic factors which were successful in some preclinical studies. FGF1 is a multipotent growth factor, plays an important role in proliferation, differentiation and cell survival. In this study, we aimed to use an episomal plasmid vector FGF1 gene transfected rat AD-MSCs for the first time, which can circumvent the concerns about the viral vectors including gene integration. We were also interested in determining whether FGF1-transfected AD-MSCs (AD-MSCs^{FGF-1}) would elaborate intact FGF1 that would accelerate fibroblast proliferation and human umbilical vein endothelial cells (HUVECs) tube formation.

MATERIAL and METHODS

Rat AD-MSCs were isolated and characterized by flow cytometry as well as adipogenic and osteogenic differentiations potency. The presence of secretory FGF1 in conditioned medium of AD-MSCs^{FGF1} were evaluated using Westen blotting and RT-PCR. G418 (Geneticin) was used for selection of the transfected AD-MSCs (AD-MSCs^{FGF1}). The angiogenic potency was assessed using NIH-3T3 cells proliferation and HUVECs tube formation assays.

Statistical Analysis

All results were expressed as mean ± SD. Student's t-test and the one-way analysis of variance were used for statistical analyses. A p value less than 0.05 was considered as statistically significant.